PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Hidenori YAMANAKA, et al.

Docket No: Q54509

Appln. No.: 09/317,986

Group Art Unit: 1771

Confirmation No.: 9754

Examiner: C. Pratt

Filed: May 25, 1999

For: MELT-BLOWN, NON-WOVEN FABRIC OF POLYARYLENE SULFIDE AND METHOD FOR PRODUCING SAME

RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please consider the following Applicants' RESPONSE to the outstanding rejection of November 20, 2003, once extended to March 20, 2004 by an appropriate one-month Petition for an extension of time and the necessary fee submitted herewith.

Claims 1, 6, 8, 10 and 18-22 are rejected. Claims 11-17 are withdrawn from consideration. All other claims have been canceled.

The prior art: Harwood et al (6,130,292); Auerbach (EP 709499); Fukata (4,454,189); Senga (EP 353717).

The rejections:

Claims 1, 18 and 21-22 under 35 U.S.C. § 103(a) as being unpatentable over Harwood or Auerbach each in view of Fukata. Paragraph 2 of the Action.

Claims 6, 8 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Harwood or Auerbach, each in view of Fukata and Senga.

Applicants traverse the above rejections on the following grounds.

Applicants first would like to discuss the non-Newtonian coefficient of the present invention, defined in claim 1 and claim 18 as 1.05 - 1.20 and in claims 21 and 22 as 1.06 to 1.19.

Table 2 taken from page 6 of the PRELIMINARY AMENDMENT of September 22, 2003 is set forth below.

Table 2

Run	Non-Newtonian Coefficient N	Average Fiber Diameter (μm)	Process Condition
Comp. Ex. 2	1.00	13.1	Δ
Comp. Ex. 1	1.02	15.0	Δ
Example 4	1.06	5.7	O
Example 2	1.09	8.1	O
Example 1	1.13	7.5	O
Example 3	1.19	9.5	O
Comp. Ex. 3	1.22	17.3	Δ

This **corrects the error** in Table 2 set forth at page 6 of the AMENDMENT UNDER 37 C.F.R. § 1.116 filed August 21, 2003 which, it is expected, led to the statement in the Action of November 20, 2003 in the paragraph bridging pages 2/3 as follows:

Yet, example 1 of Table 2, shows that an N outside of applicant's supposed critical range results in "good" processing conditions. Therefore, applicant's data conflicts with the conclusion that the claimed narrow range is critical to provide superior processing conditions. It appears that either applicant's testing methods are flawed or non-Newtonian Coefficient is not directly related to processing conditions. Applicant has failed to show criticality or unexpected results for the claimed range."

As can be seen, in view of the **corrected Table 2**, quite clearly criticality is shown, it is submitted, for the non-Newtonian Coefficient claimed herein.

Although explained in the PRELIMINARY AMENDMENT of September 22, 2003, Applicants wish to emphasize, to avoid any further confusion on this record, that the correct N value for Example 1 is 1.13 not 1.03 and the correct N value for Example 3 is 1.19 not 1.09.

Keeping in mind that the N range in the broader claims herein is 1.05-1.20, what do the data show?

First, the data show consistency once the typographical errors are removed, i.e., it is believed that the best comparison which establishes the criticality of the non-Newtonian coefficient is a comparison between Comparative Example 1 (N = 1.02) versus Example 4 (N = 1.06) and a comparison between Example 3 (N = 1.19) versus Comparative Example (N = 1.22). All remaining Examples and the remaining Comparative Example present data entirely consistent with the data relied upon and shown.

Thus, Applicants respectfully submit that it is clear from Table 2 that the symbol "O" (good melt blown stability without clogging the nozzles in a die) and "Δ" (poor melt blown stability with clogging the nozzles in die), show the evaluation of process conditions and establish the difference between "O" and "Δ" is quite distinct and dramatic, i.e., in accordance with the invention die clogging takes place whereas in accordance with the prior art die clogging does not take place.

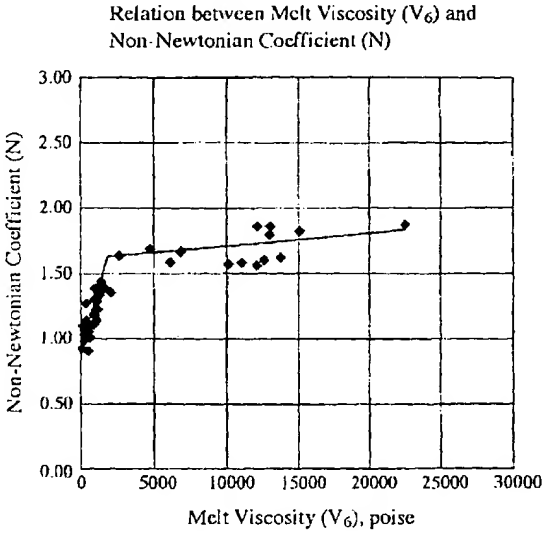
In the Action at page 3, the Examiner states in the first full paragraph:

"Previously applicant submitted a chart showing a direct relationship between melt viscosity and non-Newtonian coefficient. Applicants now appear to argue that there is no such

relationship. However, applicant fails to explain how the previously submitted graph were incorrect and how melt viscosity and non-Newtonian coefficient's are related."

It is believed that the Examiner is referring to Fig. 4 which was submitted with the RESPONSE of November 5, 2002 since this relates to "Relation between Melt Viscosity V_6 and Non-Newtonian Coefficient (N)", whereas Fig. 5 and Fig. 6 in the AMENDMENT of August 21, 2003 both plot Shear Stress v. Shear Rate.

Fig. 4



Applicants do not believe that the graph of Fig. 4 causes any contradiction with any statement made by Applicants during prosecution and again would like to refer to their statement in the Amendment Under 37 C.F.R. § 1.116 of August 21, 2003 at page 10 that:

"The non-Newtonian coefficient shows flow properties of the polymer and does not principally correlate with melt flow values. That is, although polymers may have the same melt flow rate, if they are different in their flow properties, the non-Newtonian coefficients of these polymers should be quite different [from] one another."

As has previously been explained, Fig. 4 presents the results of measurements of the non-Newtonian coefficient and melt viscosity with respect to various kinds of PPS polymers used in

the present invention and analogs thereof. As a consequence, most of the polymers which are in the melt viscosity in the range of 200-400 poise in Fig. 4 fall within the category of the present invention. However, even in Fig. 4, it can clearly be seen that the N values of the non-Newtonian coefficient fluctuate substantially at Melt Viscosity (V_6) poise at around 300 poise.

What this means is that melt viscosity does not principally correlate with the unique non-Newtonian coefficient. Accordingly, when the Examiner notes (Action, page 3, second full paragraph) that Auerbach teaches a limited melt viscosity range of 200-400 and Harwood teaches a viscosity of 300, this does not support the Examiner's position that both Auerbach and Harwood teach Applicants' claimed melt viscosity and provides more evidence that both references lead the skilled artisan towards an N value of 1.05 - 1.2 as claimed in the present application. Simple reference to Fig. 4, noting especially the cluster in Fig. 4 at around 300 poise, is, it is believed, a rebuttal of the Examiner's position.

With respect to the Examiner's statement in the paragraph bridging pages 3/4 of the present Action that the Table (here referring to Table 2) does not provide evidence that the N values are solely responsible for better processing conditions because fiber diameter (or fiber size) is not constant, Applicants respond as follows.

One major feature of the present invention lies in the fact that each fiber which constitutes the non-woven fabric of the present invention has an average fiber diameter of 10 μm or less. It is very difficult to obtain such a fine fiber in itself. As a consequence, it is essentially technically impossible to arrange fine fibers having various kinds of N values for the non-Newtonian coefficient alone which would have a simple or sole size of a single average diameter

of 10 μm or less. Table 2, Applicants submit, suggests that the process conditions for melt-blowing can be synergistically improved by following a range of average diameter of the non-woven fabric and a range for the non-Newtonian coefficient as claimed in the present application.

The present specification does not teach or suggest that it is solely the non-Newtonian coefficient which leads to the results of the present invention, rather, as shown in Table 2 both the range on the average fiber diameter and the range of the non-Newtonian coefficient are important factors.

With respect to the rejection of claims 6, 8 and 10, since claim 6 depends from claim 1, and the references relied upon to reject claim 1 fail to teach or suggest each and every element of claim 1, Applicants rely upon their arguments for claim 1 regarding claim 6.

Turning to the present Action at page 4, first full paragraph, the Examiner states:

"However, as pointed out above, Fukata further limits the teaching of N values from 0.9 - 3 to 0.9 - 2. Thus, Fukata teaches that values closer to 1.05-1.2 are superior to N values above 2."

Whether or not this teaching in Fukata is accurate, the simple fact that Fukata teaches that N = 2 is superior to N = 3 in no fashion would lead one of ordinary skill in the art to make the next "jump" to reach the present invention, namely that N = 1.05 - 1.2 would provide the results of the present invention. What Fukata actually teaches at column 4, lines 8-10 is:

"Tthe polymer having $0.9 < n < 3.0$, preferably $0.9 < n < 2.0$, is suitable for this invention." (underscore added)

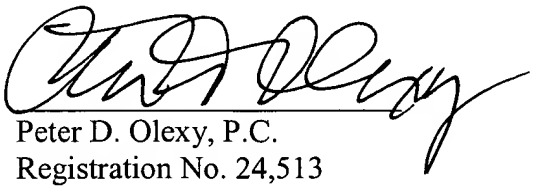
Fukata in no fashion teaches that, for example, a material exhibiting an N value of 1.20, the maximum claimed in the present application, would be "suitable for this invention", to use the terminology of Fukata.

Applicants finally wish to emphasize the importance of the range of the non-Newtonian coefficient of the present invention which in broader claims is set at 1.05-1.20. One position of the Examiner seems to be that the Fukata lower limit of 0.9 of N is extremely close to the lower limit of 1.05. However, this ignores the fact that fluid flow of materials having an N value of about 0.9 - 1.0 is generally called Newtonian flow. This is the type of flow exhibited by materials such as water, ethanol and the like. On the other hand, fluid flow of materials having an N value of 1.05 is generally called non-Newtonian flow. These flow properties are quite distinct from each other.

With respect to the rejections of claims 19-20, a telephone interview was conducted with the Examiner on March 18, 2004 regarding this rejection. Applicants pointed out that these claims have been canceled. The Examiner indicated that the rejection was "a simple mistake".

Withdrawal of all rejections is requested.

Respectfully submitted,



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